



U.S. Department  
of Transportation

**Pipeline and  
Hazardous  
Materials Safety  
Administration**

400 Seventh Street, S.W.  
Washington, D.C. 20590

**JUL 20 2005**

DOT-E 10698  
(SEVENTH REVISION)

EXPIRATION DATE: May 31, 2007

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Worthington Cylinders - Wisconsin  
Worthington Cylinders, Inc.  
Chilton, WI
2. PURPOSE AND LIMITATIONS:
  - a. This exemption authorizes the manufacture, mark, sale and use of a non-DOT specification cylinder conforming with all regulations applicable to a DOT Specification 4B, except as specified herein, for the transportation in commerce of a Division 2.2 gas. This exemption provides no relief from any Hazardous Materials Regulation (HMR) other than as specifically stated herein.
  - b. The safety analyses performed in development of this exemption only considered the hazards and risks associated with transportation in commerce. The safety analyses did not consider the hazards and risks associated with consumer use, use as a component of a transport vehicle or other device, or other uses not associated with transportation in commerce.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR §§ 173.304a(a) and 175.3 in that the use of a non-DOT specification package is not authorized, except as specified herein.

5. BASIS: This exemption is based on the application of Worthington Cylinders dated May 31, 2005 submitted in accordance with § 107.109.
6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Proper Shipping Name/ Hazardous Materials Description	Hazard Class/ Division	Identi- fication Number	Packing Group
Dichlorodifluoromethane	2.2	UN1028	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a small, low pressure, non-DOT specification cylinder conforming with the applicant's drawing (Chilton Metals drawing no. 32313-21) dated March 8, 1991, and other drawings and calculations on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA), and in conformance with the requirements of a DOT Specification 4B cylinder (§§ 178.35 and 178.50) except as follows:

§ 178.50 (a) *Type, size, and service pressure.*

The cylinder must be of brazed construction. Longitudinal seams are prohibited. Maximum water capacity must not exceed 3 pounds. Service pressure must be at least 240 psig but not over 300 psig.

§ 178.50 (b) *Steel.*

Only steel meeting the following is authorized:

	<u>Ladle analysis</u>	<u>Check analysis</u>
Carbon, max. percent	0.12	0.15
Phosphorus, max. percent	0.04	0.05
Sulfur, max. percent	0.05	0.06

§ 178.50 (d) *Manufacture.*

Cylinders must be manufactured using equipment and processes adequate to ensure that each cylinder produced conforms to the requirements stated in the

exemption. No defect is permitted that is likely to weaken the finished cylinder appreciably. A reasonably smooth and uniform surface finish is required. Inside surfaces must be clean, dry, and free of loose particles. Seams must be made as follows:

(1) Circumferential seams must be brazed. Mating shells attached by brazing must have a driving fit with shell, unless the shell is crimped, swedged, or curled over the skirt or flange of the mating shell, and be thoroughly brazed until complete penetration of the brazed joint is secured. Brazing materials must have a melting point no lower than 1000°F. The brazing material must completely penetrate the full length and the width of any brazed joint. The length of the brazed joint must be no less than four times the thickness of the shell wall.

(2) Longitudinal seams are not permitted.

§ 178.50 (f) *Wall thickness.*

(1) The minimum wall thickness must be such that the wall stress at the minimum test pressure does not exceed 21,000 pounds per square inch. The wall thickness for any cylinder must be no less than 0.037 inch.

(2) \* \* \*

§ 178.50 (h) *Opening in cylinders.*

(1) Openings are permitted in heads only. Each opening in the cylinder must be provided with a fitting securely attached to the cylinder by brazing. If threads are used, they must comply with § 178.50(h)(1)(i) through (iii). Provision (iv) does not apply.

\* \* \*

(2) \* \* \*

§ 178.50 (i) *Hydrostatic test.*

(1) Each cylinder must be tested at an internal pressure of at least two times the service pressure and must be held at that pressure for at least 30 seconds.

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(i) The leakage test must be conducted by submersion under water or by some other method that will be equally sensitive.

(ii) Where pneumatic testing is used, means designed to protect personnel must be provided.

(iii) If the cylinder leaks, displays visible distortion, or any other defect, while under test, it must be rejected (see § 178.50 (m)).

(2) One cylinder taken from the beginning of each lot, and one from each 1,000 or less successively produced within the lot thereafter, must be hydrostatically tested to destruction. The entire lot must be rejected if (see § 178.50 (m)).

(i) A failure occurs at a gauge pressure at or below 2.0 times the test pressure.

(ii) A failure initiates in the brazed area thereof, or

(iii) A failure is other than in the sidewall of the cylinder longitudinal with its long axis.

(3) A "lot" is defined as 1,000 cylinders successively produced having identical size, design, construction, material, heat treatment, finish, and quality.

§ 178.50 (j) *Flattening test.*

One cylinder must be taken from the beginning of production of each lot (as defined above under § 178.50(i)) and subjected to a flattening test. The flattening test must be performed on a cylinder that has been tested at test pressure. The flattening must be between 60 degree included angle, wedge shaped knife edges rounded to a 0.5 inch radius. Cylinders must be flattened so that their outer surfaces are not more than six times wall thickness apart.

§ 178.50 (l) *Acceptable results for physical and flattening tests.*

(1) \* \* \*

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(2) If any cylinder cracks when subjected to the specified flattening test, the lot of cylinders must be rejected (see § 178.50 (m)).

§ 178.50 (n) *Markings.*

The following marks must be applied at the valve end of each cylinder by embossing or stamping plainly and permanently on the head of the cylinder or on a plate which is permanently attached to the head of the cylinder:

(1) Each cylinder must be marked "DOT-E 10698" followed by the service pressure.

(2) Serial number or lot number and the manufacturer's registration number or an identifying symbol registered with the OHMEA.

b. OPERATIONAL CONTROLS -

(1) Cylinders may only be used and filled as specified in the instruction manual for General Electric Company's 1642 Refrigerant Recovery Pump.

(2) The cylinder must be manufactured and inspected in accordance with § 178.35 except for § 178.35 (f) though (i).

(3) Each cylinder must be retested in accordance with § 180.205 as prescribed for DOT 4B specification cylinders at an internal pressure of at least 2 times service pressure.

8. SPECIAL PROVISIONS:

a. In accordance with the provisions of paragraph (b) of § 173.22a, persons may use the packaging authorized by this exemption for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this exemption.

b. A person who is not a holder of this exemption who receives a package covered by this exemption may reoffer it for transportation provided no modifications or changes are made to the package and it is reoffered for transportation in conformance with this exemption and the HMR.

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- c. A current copy of this exemption must be maintained at each facility where the package is offered or reoffered for transportation.
- d. Each packaging manufactured under the authority of this exemption must be marked with a registration symbol designated by the Office of Hazardous Materials Exemptions and Approvals for a specific manufacturing facility.
- e. A current copy of this exemption must be maintained at each facility where the package is manufactured under this exemption. It must be made available to a DOT representative upon request.
- f. Cylinder must be shipped in strong outside packagings in accordance with § 173.301(a)(9).
- g. Design qualification test results which indicate that the prototype containers successfully passed the qualification tests specified in this exemption must be on file with the OHMEA prior to initial shipment.
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle and rail freight only.
10. MODAL REQUIREMENTS: A copy of this exemption must be carried aboard each motor vehicle used to transport packages covered by this exemption.
11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this exemption and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:
- o All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, Parts 171-180.
  - o Persons operating under the terms of this exemption must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
  - o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this exemption must receive training on the requirements and conditions of this exemption in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this exemption, including display of its number, when the exemption has expired or is otherwise no longer in effect.

12. REPORTING REQUIREMENTS: Shipments or operations conducted under this exemption are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 - Immediate notice of certain hazardous materials incidents, and 171.16 - Detailed hazardous materials incident reports. In addition, the grantee(s) of this exemption must notify the Associate Administrator for Hazardous Materials Safety -- OHMEA, in writing, of any incident involving a package, shipment or operation conducted under terms of this exemption.

Issued in Washington, D.C.:

*Robert A. McGuire*  
Robert A. McGuire  
Associate Administrator for  
Hazardous Materials Safety

**JUL 20 2005**  
(DATE)

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, Department of Transportation, Washington, D.C. 20590.  
Attention: PHH-31.

Copies of this exemption may be obtained by accessing the Hazardous Materials Safety Homepage at <http://hazmat.dot.gov/exemptions> Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

PO: KFW/AM